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EVALUATION OF SPRAY COVERAGE ON THE BEECH CREEK SEED ORCHARD, TUSQUITEE RANGER DISTRICT, NANTAHALA NATIONAL FOREST

By

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INTRODUCTION

Insecticide control with Guthion(R), Cygon(R), Malathion(R), and others has at times proven ineffective. Many reasons are given for this lack of insect control, i.e. insect resistance to an insecticide, chemicals sprayed at the wrong time of the insects life cycle (timing), incorrect dosage rates and a long list of others including insufficient spray deposits reaching the target insect. It goes without saying that good insect control on Federal seed orchards is a primary concern of both Forest Resource Protection and the National Forests in the South. This evaluation was an attempt to monitor and improve the spray coverage on the Beech Creek Seed Orchard.

METHODS AND MATERIALS

Approximately 15 eastern white pine, *Pinus strobus* L., 8.2-9.8m, in height were sprayed by a Friend Airmaster 365 using a solution of .47 liters of Rhodamine Bx dye in 190 liters of water (Fig. 1). The red dye solution was to simulate an insecticide application of Guthion(R). The mixture was sprayed onto "cone-spray cards" which were affixed within the tree crown at the upper, middle and lower crown levels to demonstrate spray coverage.

The"cone-spray cards" were cut from graph paper to fit soft drink cans which hung from tree branches by four chains (Figs. 2 and 3).

The sprayer was pulled past both sides of the test trees at a normal operational rate of speed simulating spray conditions. The"cone-spray card"paper was changed after each treatment.

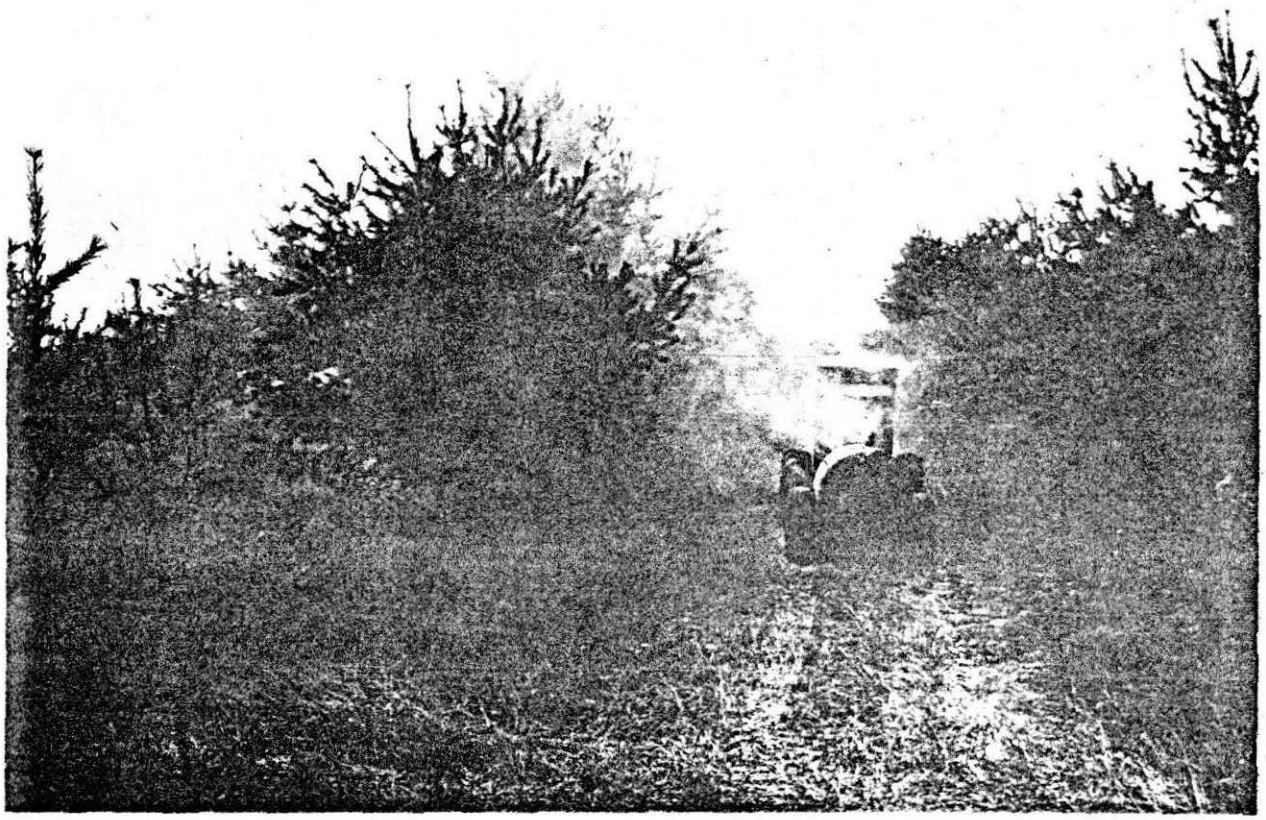


Figure 1. Friend Airmaster 365 sprayer after adjustments demonstrating spray application in upper tree crown.

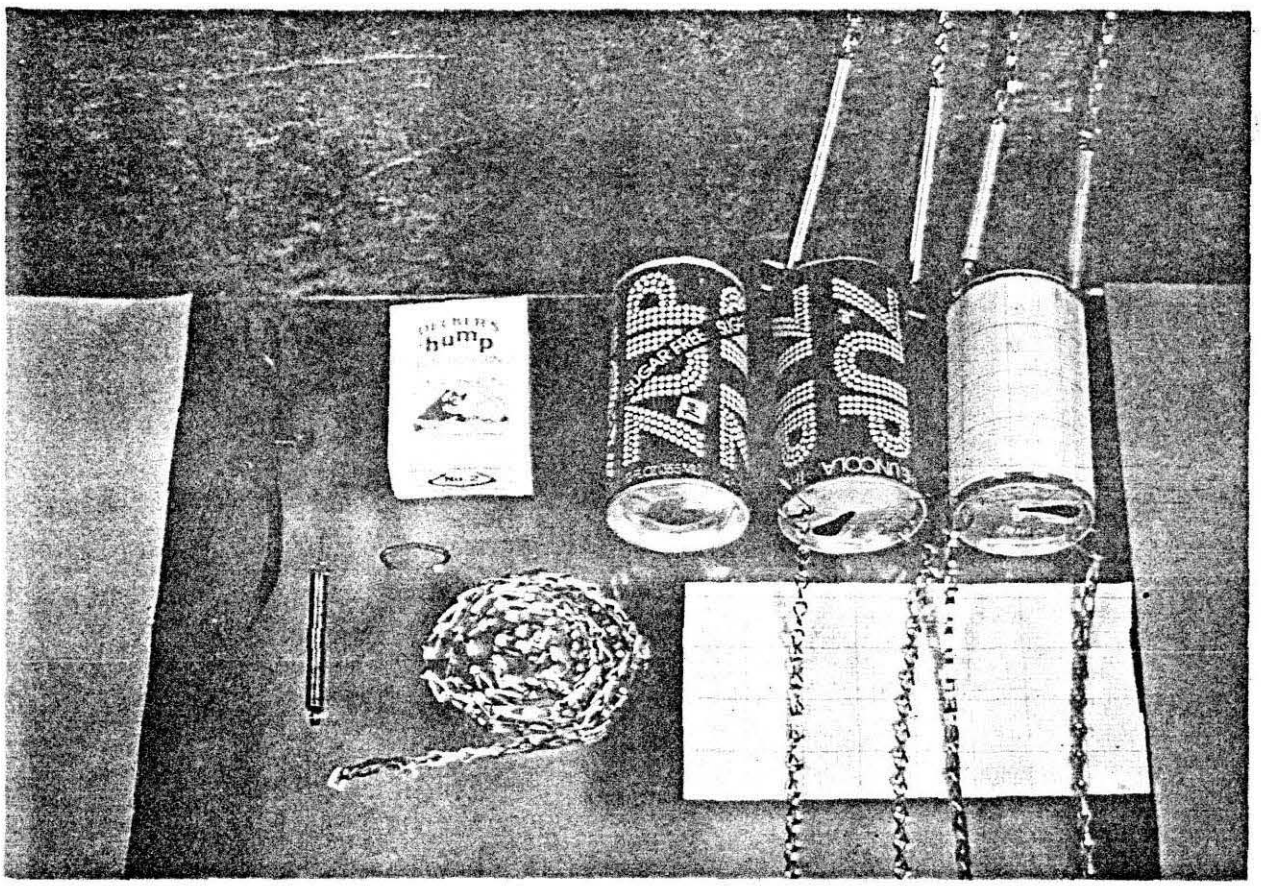


Figure 2. Necessary component parts for the "cone-spray card".

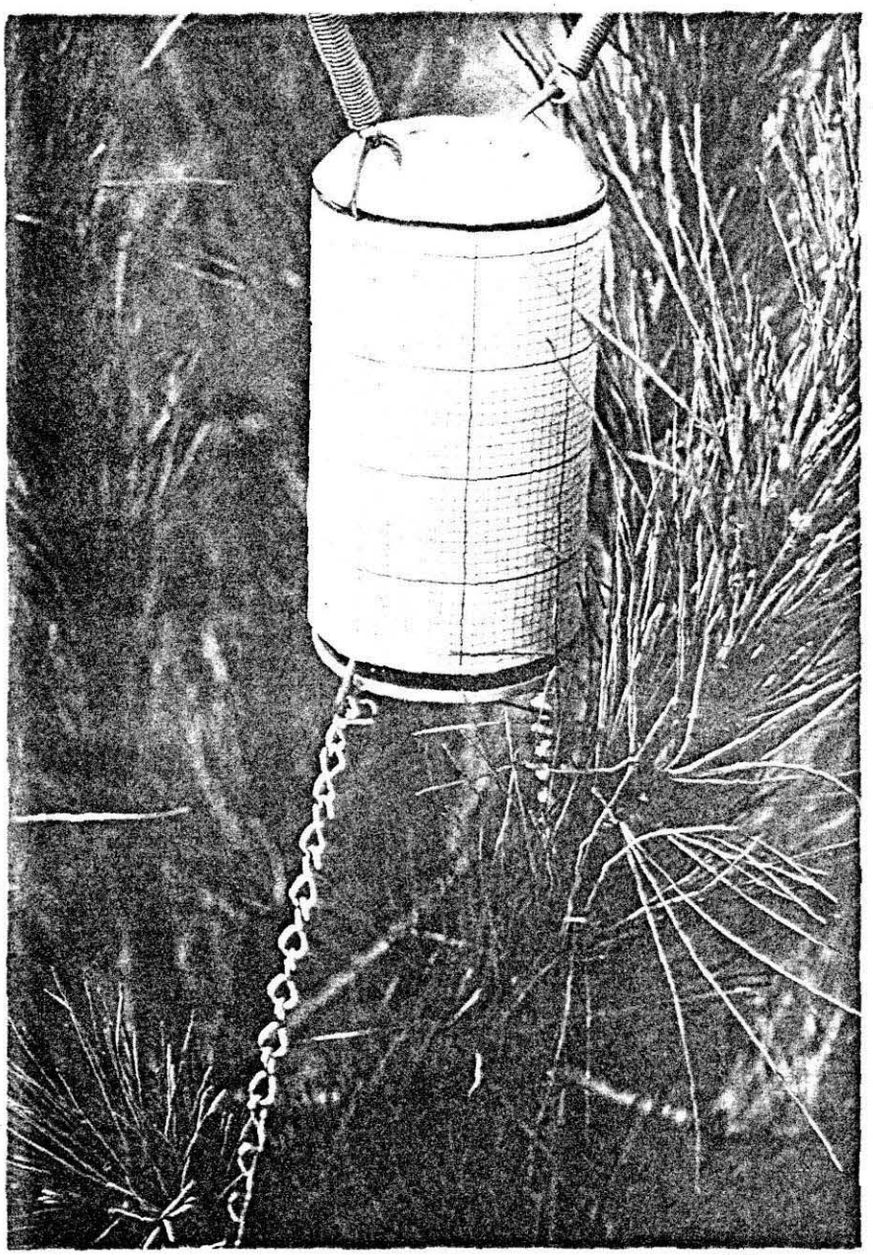


Figure 3. Cone-spray card in white pine upper crown showing spray deposit.

RESULTS AND DISCUSSION

Examination of "cone-spray cards" from two trees indicated that coverage was not obtained in the top 1/3 of the tree crown and that coverage was, in general, limited to only one side of the "cone-spray card" (Fig. 4A). After adjustments to the sprayer, i.e., addition of three nozzles per side, better spray coverage was obtained on the "cone-spray cards" in the top of the trees and spray coverage all around the "cone-spray cards" improved (Fig. 4B).

It is well known that most of the cone crop is produced in the upper tree crown and therefore control sprays need to reach this area. Ideally, all cones and conelets would have uniform coverage with sufficient spray deposits to kill the pest organism. What is not known is how many droplets of what size are needed to do the job. A study to investigate this could provide the seed orchard manager with just such a tool.

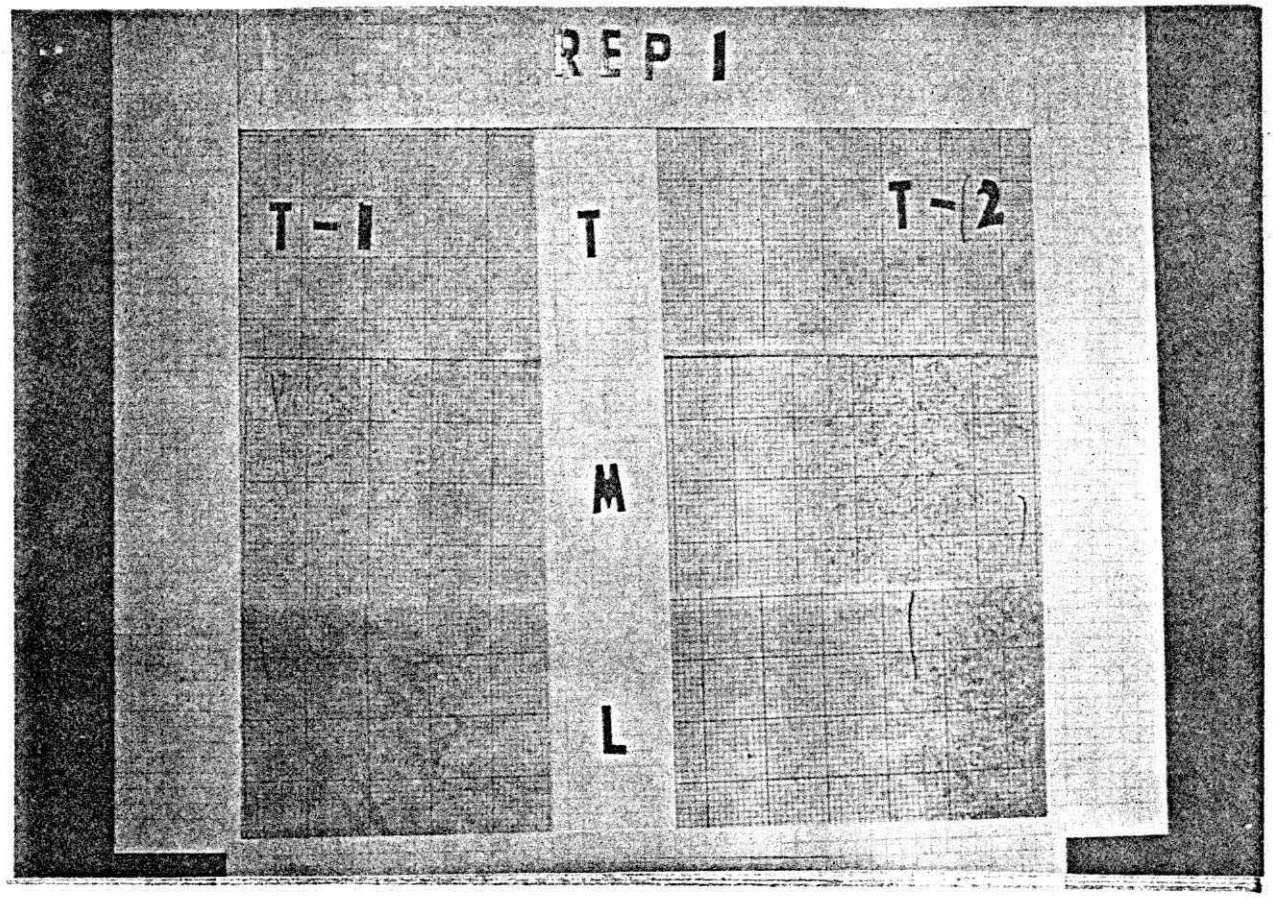
SUMMARY

The "cone-spray card" system showed that spray deposits did not reach the upper tree crown with spray equipment as it was being used on the Beech Creek Seed Orchard. In addition, the spray that did reach the "cone-spray cards" was found on only one side of the cone cards even though both sides of the trees were sprayed. After adjustments were made to the sprayer, the spray deposits not only reached the upper crown but were found in several cases all around the "cone-spray card" indicating much better coverage.

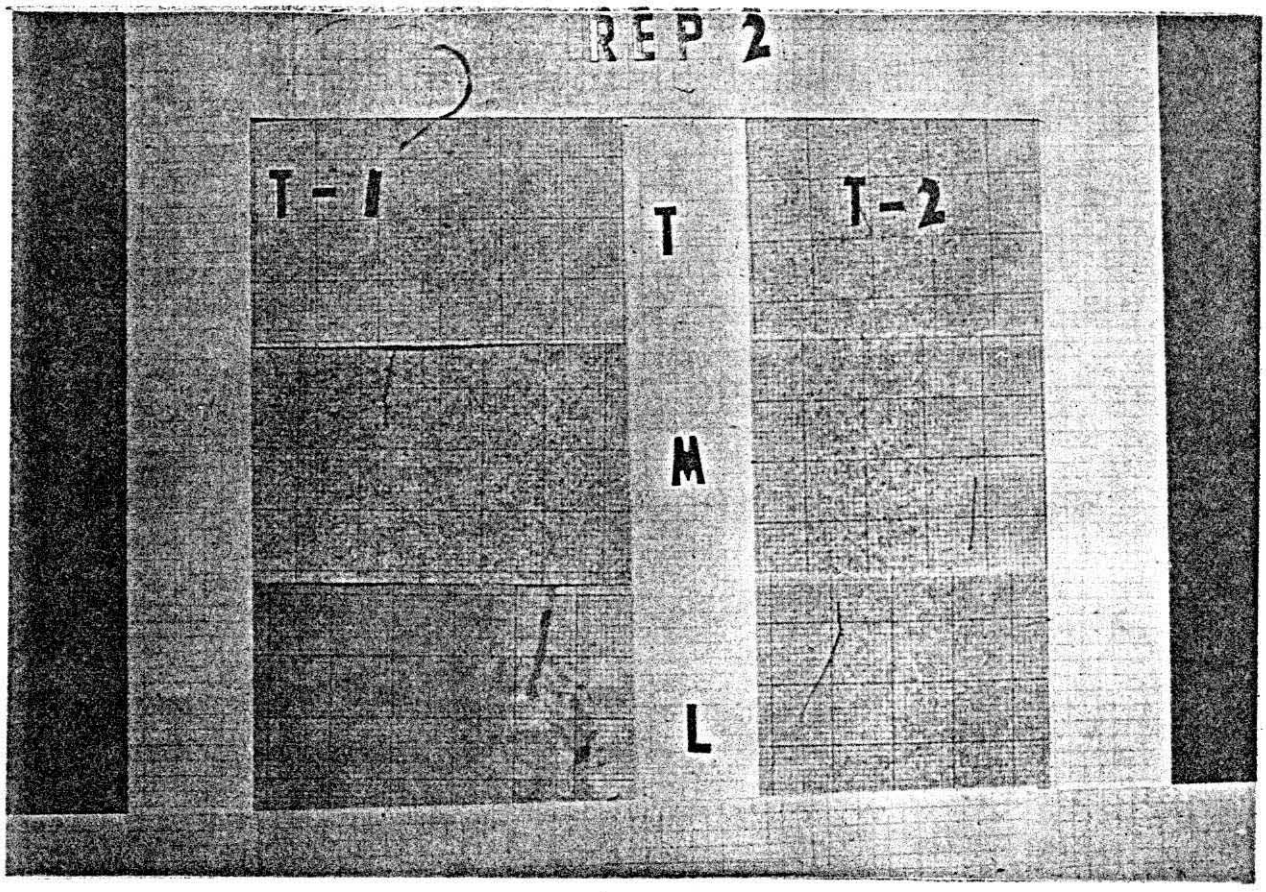
RECOMMENDATIONS

We recommend that future spray applications by personnel of the Beech Creek Seed Orchard use the sprayer as adjusted for the final spray test.

Each spring prior to spraying, the above described method should be used to insure coverage of the tree's upper crown. This is necessary to insure insect control and an adequate seed supply for National Forest use. If any adjustments are made to the sprayer during the spray season, the coverage should again be checked.



A



B

Figure 4. Spray card paper from tree 1 and 2 demonstrating spray coverage from a Friend Airmaster 365 sprayer on the top (T), middle (M), and lower (L) tree crown. A - before adjustment. B - after adjustment.